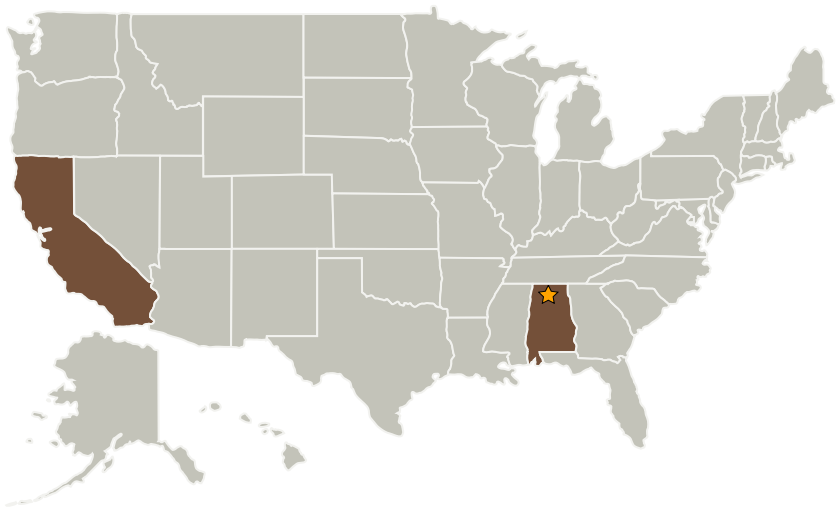
Foam-Reinforced Polymer Matrix Composite Radiation Shields, Phase I

Completed Technology Project (2006 - 2006)

Project Introduction

New and innovative lightweight radiation shielding materials are needed to protect humans in future manned exploration vehicles. Radiation shielding materials are needed for large structures such as the space station, orbiters, landers, rovers, habitats, and spacesuits. Materials currently used are heavy, bulky, and ineffective in shielding humans against cosmic radiation, especially over long periods (months or years). One means of solving the problem of heavy radiation shields is to use lightweight polymeric shields that do not produce dangerous secondary radiation when irradiated, but these are typically not mechanically sound in structural applications. Ultramet has developed a versatile method for producing metal and ceramic foams that would function well as reinforcement phases in polymeric shields. This material is amenable to complexly shaped and large components and has been demonstrated under other programs to provide good particle trap capacity and exhibit no damage under extreme variations of temperature, high porosity, and low density. Ultramet proposes to fabricate high-efficiency polymer matrix composite radiation shields that will withstand repeated exposure to cosmic radiation. Initial shielding performance will be demonstrated through simulated cosmic radiation testing at Eril Research, and the program will benefit from collaboration with Northrop Grumman, a potential end user of the technology.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Ultramet	Supporting Organization	Industry	Pacoima, California

Primary U.S. Work Locations	
Alabama	California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.5 Radiation
    - TX06.5.3 Protection Systems